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METHOD OF SHIELDING BIOSYNTHESIS REACTIONS FROM THE AMBIENT ENVIRONMENT ON AN ARRAY

ABSTRACT OF THE INVENTION

A method of fabricating an array of biopolymers provides a shield for biochemical reactions and biochemical reactants and is particularly useful for those reactions and reactants that are susceptible to reaction with a component of the ambient environment during the fabrication of the array. The method is applicable to the conventional fabrication and synthesis methods used to fabricate a biopolymer array, such as in situ synthesis of biopolymers on an array and the attachment of pre-synthesized biopolymers on to an array. The method comprises applying a non-miscible fluid (NMF) to the array surface where the biopolymers are being synthesized or attached. The NMF is inert and insoluble with the biochemical reactants and other ancillary materials in solution used in conventional synthesis or attachment of biopolymers. The NMF provides a shield between the ambient atmosphere and the biopolymer synthesis materials or the deprotected pre-synthesized biopolymer at the surface of the array during the synthesis or attachment processes. The NMF may be applied as droplets over each feature location on the surface or may be applied by flooding the surface of the array to fully cover the features. Biomonomer or biopolymer solutions are deposited into or through the NMF to the feature locations on the surface of the array where the synthesis or attachment reactions are to take place using conventional deposition equipment to eject the solutions into the NMF. The NMF provides a shield for activated biomonomers that are susceptible to reaction with a component in the ambient environment, such as moisture in the air. Moreover, the NMF provides a shield for pre-synthesized biopolymers that are susceptible to evaporation when deprotected for attachment to the array surface. The method provides a means by which the potential reactivity of the activated biomonomer or deprotected biopolymer with an ambient atmosphere component can be kept low. As a result, biopolymer arrays can be more accurately fabricated.